ABSTRACT

Solid free form fabrication techniques such as fused deposition modeling and three-dimensional printing are used to create a shell or die used in the manufacture of a dental restoration. Three-dimensional printing comprises ink-jet printing a binder into selected areas of sequentially deposited layers of powder. Each layer is created by spreading a thin layer of powder over the surface of a powder bed. Instructions for each layer may be derived directly from a CAD representation of the restoration. The area to be printed is obtained by computing the area of intersection between the desired plane and the CAD representation of the object. All the layers required for an aesthetically sound shell can be deposited concurrently slice after slice and sintered/cured simultaneously. While the layers become hardened or at least partially hardened as each of the layers is laid down, once the desired final shaped configuration is achieved and the layering process is complete, in some applications it may be desirable that the form and its contents be heated, cooled or cured at a suitably selected temperature to further promote the integrity of solid free-form structures.